

PATENT SPECIFICATION

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669,019

Date of Application and filing Complete Specification July 26, 1950.

No. 18639/50.

Complete Specification Published March 26, 1952.



Index at acceptance:—Class 80(ii), C3b.

COMPLETE SPECIFICATION

Improvements relating to Tubular Drive Shafts

We, HARDY, SPICER & CO. LIMITED, a British Company, of Birch Road, Witton, Birmingham, 6, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a tubular drive shaft which transmits a drive to or from gearing, a torque-converter or the like—for example, to a propeller shaft, of a motor-vehicle, transmitting a drive from a change speed gearing to an axle gearing.

It is known, with a view to interrupting or suppressing noise from such a gearing, to fit the tubular drive shaft with axially-spaced cork inserts which are push fit therein. For example, in the case of a propeller shaft of about 4' in length, it is known to use three such inserts, each of an axial length of about 1", spaced from one another and from the ends of the shaft; and in this way it is possible to lessen the transmission of such noises.

The main object of the present invention is to provide improved means for this purpose, i.e., for further lessening the transmission of such noises.

The invention involves the combination with a tubular drive shaft transmitting a drive to or from a gearing or the like, of one or more lengths of cardboard or equivalent material mounted in the interior of the shaft.

Preferably there are at least two such inserts of cardboard or equivalent material spaced from one another and from the ends of the shaft. For example, in the case of a propeller shaft, for a motor-vehicle, of a length of about 4', there may be only two such cardboard or like inserts. For a longer shaft there might be three, and so on.

It is preferred that each of said inserts should be a tubular one. Whereas it may be a drive fit in the shaft, it is preferably slightly oversize (in diameter) and pro-

vided with a relatively wide longitudinal slit along the whole of its length—for example, a slit of a width of about $\frac{1}{2}$ " when the insert is not radially compressed. Such a slit cylinder will be a light fit in the shaft, being held more fully in contact with the shaft under centrifugal force; and it is found that a lightly fitting insert as aforesaid is better able to damp out frequencies set up in the shaft than in the case in which the insert takes the form of a solid tube of cardboard or the like secured in the tube as a drive fit.

In the accompanying drawings:—

Figure 1 is a part-sectional elevation of a propeller shaft assembly for transmitting torque from a change-speed mechanism of a motor-vehicle to a back axle gearing; and

Figure 2 is a section taken on the line 2—2 of Figure 1.

In the drawings the propeller shaft 11 is a tubular one having a bore, say, of 2" and a length of 4'. Welded or otherwise secured to its ends are the spigots 12, 13 of a driving universal joint 14 and a driven universal joint 15 respectively.

In the present instance, in carrying out the invention, use is made of two tubular inserts 17, 18 of cardboard, each having a length of about 8" and having their remote ends 19, 19 spaced from the adjacent ends 20, 20 of the shaft by equal distances of about 10".

Each of the inserts is slightly oversize in diameter in its unstressed or natural state, for example, of an overall diameter of about $2\frac{1}{16}$ ", and is provided with a longitudinal slit 22 of a width of about $\frac{1}{2}$ " along the whole of its length. In consequence it is only slightly radially compressed when in the interior of the shaft; but adequate contact with the shaft is ensured by centrifugal forces when the shaft is rotated.

What we claim is:—

1. The combination with a tubular drive shaft transmitting a drive to or from

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- a gearing, torque-converter or the like, of one or more lengths of cardboard or equivalent material mounted in the interior of the shaft and serving for suppressing the transmission of noise along the shaft.
- 5 2. The combination of claim 1, in which there are at least two such inserts spaced from one another and from the
- 10 ends of the shaft.
3. The combination of Claim 1 or 2, in which the said insert is a tubular one.
4. The combination of claim 3, in which the said tubular insert is slightly oversize (in diameter) but with a relatively wide longitudinal slit along it.
5. The complete propeller shaft substantially as described with reference to the accompanying drawings.
- Dated this 25th day of July, 1950.
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Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1952.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which
copies may be obtained.

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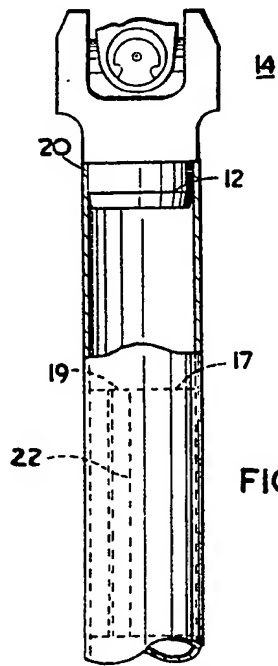


FIG. 1

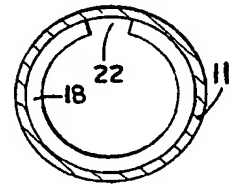
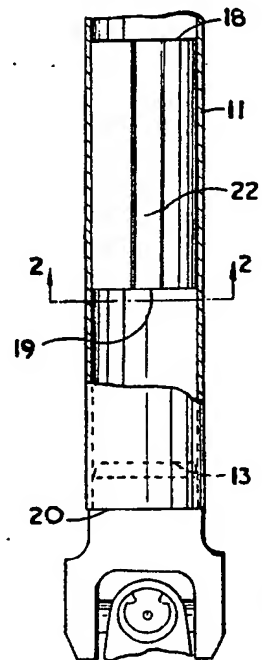


FIG. 2

H.M.S.O. (M.F.P.)